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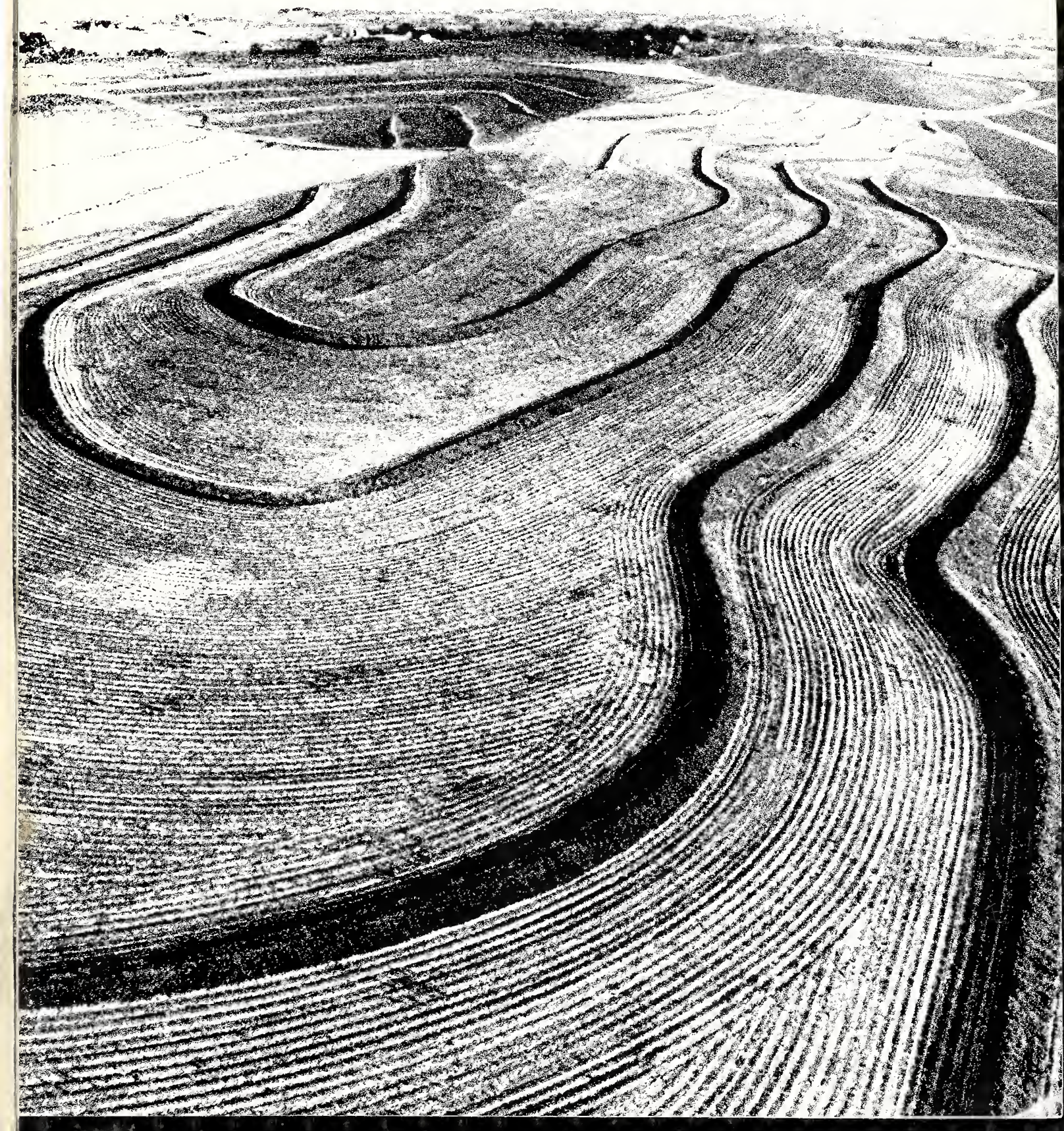

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Comments:

From the SCS Chief

The biggest water consumer in the United States is agriculture, accounting for about 83 percent of water use. It is therefore up to agricultural producers to use water resources wisely and to insure that the water they use is of the highest possible quality when it leaves their land.

Many of these producers need financial and technical assistance to apply best management practices necessary to control agricultural nonpoint source pollution. These practices when properly applied will also stretch our dwindling supplies of surface and ground water. The Soil Conservation Service has become increasingly expert at assisting landowners in protecting and improving water quality and quantity, and we need to stand ready to continue our assistance.

SCS is already involved in a number of water resource activities: The Colorado River Basin Salinity Control Program; State 208 water quality planning and implementation; river basin studies; the Model Implementation Program projects through the Agricultural Conservation Program; the Public Law 83–566 Small Watershed Program; the Rural Clean Water Program; and improving irrigation efficiency and management of surface and ground water supplies.

The current condition of water resources forces us to take a new look at SCS's historic role in erosion control. Reducing erosion to tolerable rates alone does not always improve water quality as much as necessary for certain water uses. We therefore must urgently seek to reduce erosion for the sake of both the land and the water through the application of comprehensive conservation systems.

SCS for many years has been active in trying to control nonpoint sources of pollution in the Great Lakes. I served as chairman of the U.S. section of the Great Lakes Pollution from Land Use Activities Reference Group which conducted a 5-year study of the problem for the International Joint Commission.

In the area around Lake Erie, landowners have reduced erosion to tolerable levels, but heavy loadings of phosphorus continue to reach the lake. The pollutants are attached to sediment carried by runoff from farmlands. Conservation practices are critically needed to control runoff and prevent fertilizers, pesticides, and livestock waste from entering streams. Along with State, local, and other Federal agencies, SCS is now targeting assistance to that area.

SCS is also cooperating with USDA's Agricultural Research Service to determine which conservation practices or combination of practices can best control sediment and other pollutants. And we are providing employees with special training in water quality planning and management. We know that a stable soil base will be useless without adequate supplies of clean water.

Cover: Terraces are one of many conservation practices that reduce sediment content in runoff water and conserve moisture. (Photo, Tim McCabe, photographer, Information and Public Affairs, SCS, Washington, D.C.)

John R. Block
Secretary of Agriculture

Norman A. Berg, Chief
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Improving Water Quality

The following articles are examples of nationwide efforts to protect and improve water quality. Communities and individual landowners receive technical and financial assistance through cooperative projects from the Soil Conservation Service and State, local, and other Federal agencies.

Cove Creek Cleanup

by Paxton G. Wolfe

At last count, 12 agencies or groups were cooperating with landowners to improve water quality in the 24,000-acre Cove Creek watershed in Fulton County, Pa.

The watershed is approximately 60 percent cropland and grassland with the remainder in woodland. The project to clean up the watershed was initiated in 1979 by the Fulton County Agricultural Stabilization and Conservation Service (ASCS) County Committee when they learned that funds from the Agricultural Conservation Program (ACP) were available. The money is being used to share with landowners the cost of installing best management practices to improve water quality in Cove Creek, a tributary to the Potomac River.

The Fulton Conservation District publicized the program and held an information meeting for landowners in the watershed. The program was explained by Ron Phelps, Soil Conservation Service district conservationist; Stanley Palmer, SCS soil conservation technician; and John Johnston, ASCS Fulton County executive director.

SCS assisted landowners in developing conservation plans with the goal of controlling erosion from fields and streambanks and managing animal waste.

Cyrus Randler and his brother-in-law, Reed Richards, are working to clean up Spring Run, a tributary of Cove Creek. Since livestock will not cross a stream where riprap is placed along the streambanks but will cross where suitable access is provided, Randler and Richards installed 1,000 feet of rock riprap and three livestock crossings. Two of the crossings were made with reinforced concrete and one with imbedded railroad ties. They also installed two rock deflectors to divert water from eroding banks, and mud sills—made with rock and utility poles—to protect eroding streambanks and provide a hiding place for fish.

The Pennsylvania Fish Commission furnished $1,000 for materials

Field stones (below left) and a mud sill (below right) placed along Spring Run, a tributary to Cove Creek, will protect the streambanks from erosion during peak flows. The mud sill also provides a hiding place for fish.

and supervised the stream work done by a Comprehensive Employment and Training Act (CETA) crew, which was sponsored by the Fulton County Commissioners.

Stones for the riprap, which were not cost shared by ACP, were collected from piles previously picked from fields. Randler hauled them to the streambank and the CETA crew put them into place. The United Telephone Company donated the poles and Conrail donated the railroad ties. The Pennsylvania Bureau of Forestry transported the poles and ties to the construction site. The U.S. Army Corps of Engineers and the Pennsylvania Department of Environmental Resources granted the installation permits for the stream channel devices.

One of the cost-shared practices, animal waste control facilities, will have a dramatic side benefit for a local hog raising and processing operation. Charles Walker, manager of the operation, said his production will nearly double after a 42- by 88- by 6-foot reinforced-concrete, manure-holding tank is installed. On the slats over the tank he will build well-ventilated, roofed-over, insulated hog pens. Each spring Walker plans to empty the tank to supplement petroleum-based fertilizer requirements for his corn land.

Since the water quality project started in 1979, Walker also has established 196 acres of permanent vegetative cover, improved 202 acres of permanent vegetative cover, established cropland protective cover on 10 acres, and seeded 3 acres to protect a critically eroding area.

Another project for the Cove Creek watershed, an outdoor classroom, will be developed by the Vocational Agricultural Department of the Central Fulton High School and the Fulton Conservation District. Nature trails at the outdoor classroom will be available to area schools and the public to learn about plants and wildlife.

Lonnie Palmer, chairman of the Fulton Conservation District, said, "With this kind of support from all of these people, we cannot help but improve the water quality in the watershed and the quality of life of the people of the McConnellsburg area."

The cost of the conservation practices installed so far in the Cove Creek Project is $57,655. ACP cost shares were $25,827. Farmers, county commissioners, and State agencies paid the remainder.

Paxton G. Wolfe,
woodland conservationist,
SCS, Harrisburg, Pa.

Saline Seeps—Montana's Threat to Water Quality

by Martha Anne Dow, Hal Watson, and Brad Anseth

Saline seeps—wet, salty areas in nonirrigated soils that reduce or eliminate crop production—have been described as one of Montana's biggest conservation problems. More than 200,000 acres of cropland have been damaged statewide; and, for the last 10 years, the number of seeps has been increasing at a rate of 10 percent per year because of cropping practices and increased precipitation.

Saline seeps also cause water quality problems. As a result of the Federal Water Pollution Control Act of 1972 and the Clean Water Act of 1977, Montana conservation districts are preparing water quality management plans to solve nonpoint source pollution problems, including those caused by saline seeps.

Tour Informs Public

The Hill County Conservation District in north-central Montana conducted a tour for farmers and ranchers, representatives of local chambers of commerce, and college students to acquaint them with the county's water quality problems. The tour began with an explanation that water not used by crops fosters seeps. The tour guides explained the interrelationship of saline seep with ground water and surface water pollution.

Three saline seep areas on the tour showed the causes of and solutions to the problem. At each site, the local landowner explained the history of the seep and discussed current reclamation techniques.

Paul Brown, a saline seep researcher with the USDA Science and Education Administration, and Ted Dodge, leader of the State-funded team that works with landowners, demonstrated drilling rig and moisture probe techniques in defining a seep area.

They also explained re-cropping using a flexible cropping system. This method advocates planting when more than 3 inches of water are available at seeding time on fine and medium soils, and advocates fallowing when less than 3 inches are available. On one landowner's seep, alfalfa and other legumes were effective in drying out deep subsoils.

Also included on the tour were a pond at a natural gas collecting

station that was used to prevent pollution of a local stream, and a multiple-use watershed project including a dam in the Bearpaw Mountains. Urban development without proper planning was cited as another potential water quality management problem.

The tour was only an introduction for Hill County residents to the nonpoint source pollution problem, especially saline seeps. The conservation district will now be working on the water quality management plan to improve ground and surface water quality.

One Rancher's Experience

Not only do saline seeps damage cropland, but they also can ruin stock water sources. Blaine County, Mont., rancher Tom Burns found this out. For 25 of the 35 years he ranched west of Chinook, Burns had no problems. But in the last 10 years, his water quality problem became critical, especially in a 545-acre pasture where one reservoir provided all the stock water.

"Up to about 10 years ago we never noticed anything amiss. Then we turned a herd of cattle out into that pasture and checked on them a couple of days later," Burns explained. "Here they all were in the fence corner waiting to get out."

Burns found a few head at the reservoir. "I watched one cow walk about 10 feet and look for a drink. Then she would go another 10 feet and look for a drink. And here this water was right in front of her. We knew something was wrong."

The water situation got so bad that Burns was hauling water twice a day to get his cattle to use the grass. On an average year the pasture supported 40 pair.

Through the Blaine County Conservation District, Burns requested assistance from the Soil Conservation Service and the Triangle Conservation District saline seep team. With this help, Burns located the sources of his water quality problem and received suggestions on solving it.

Burns' water quality problem grew as the land around him was converted from rangeland into cropland. Saline seep researchers in Montana have found a correlation between crop-fallow farming systems and saline seeps. They concluded that moisture in excess of that which can be stored in the soil during fallow periods is the major cause of saline seeps.

These researchers say the most effective way to control saline seeps is to make sure that plants in the recharge areas use all of the available moisture. Recharge areas are areas where water unused by crops filters down below the root zone picking up natural salts. This salt-laden water then hits an impervious geologic formation or a natural aquifer, moves laterally, then resurfaces. If all available moisture is used, water won't filter down and pick up salts. To assure that plants use this moisture, Montana farmers usually must change farming methods and often crops.

Unfortunately, Burns didn't farm or control the cropland that serves as a saline seep recharge area and the source of the salt-laden water which moved into his reservoir.

Because he didn't control the recharge areas, Burns' options were limited. Draining the reservoir, flushing it, and then refilling it was out of the question. The flushing would only increase someone else's problem downstream and violate State water quality laws. Besides, future runoff would still be salt laden.

Wells in the pasture were ruled out. Years ago Burns drilled a 380-foot well that barely provided enough salty water for one cow.

"I really hadn't considered any solution but the stop-gap measure of hauling water," Burns said. "It was an expensive choice; but if I hadn't hauled water, I wouldn't have been able to keep the cattle I did."

Last year Burns permanently solved his livestock water problem. He had thought a pipeline would be too expensive; but through the Montana Rangeland Resources Loan Program and with cost-share assistance from the SCS Great Plains Conservation Program, he was able to fill stock tanks by piping water 2½ miles from a good well at his ranch headquarters.

"The pipeline will solve my stock water problem, but the salty reservoir is still there," Burns said. He points to his reservoir and the coulees that fill it. "All these coulees are getting worse. The bottoms are all salty and the grass and other plants are encrusted with crystals."

Cooperation among landowners is the only long-term solution to saline seep problems. But when cooperation isn't possible, as in Tom Burns' situation, all that is left is treating the symptoms.

Martha Anne Dow,
urban supervisor, Hill County Conservation District, Havre, Mont.

Hal Watson,
district conservationist, SCS, Havre, Mont.

Brad Anseth,
public information officer, SCS, Bozeman, Mont.

Taming Runoff Water to "Walk" in Slaughterhouse Gulch

by Deborah Miller

In Slaughterhouse Gulch, farmers aim to get runoff water to "walk" down farmland slopes rather than to run down them.

Slaughterhouse Gulch—a 13,000-acre watershed named for an old slaughterhouse once located near the center of the area—drains through the eastern Oregon wheat community of Moro. Agricultural Conservation Program (ACP) funds of nearly $74,000 were granted through 1981 for the Slaughterhouse Gulch special project. The reason was a water quality survey in Sherman County which the Oregon Department of Environmental Quality conducted revealing that the watershed was very susceptible to erosion and in need of conservation work.

The survey and the resulting special project were to help control nonpoint source pollution as identified in statewide water quality plans. The plans were developed as a result of the Federal Water Pollution Control Act of 1972 and the Clean Water Act of 1977. A major aim of the Slaughterhouse project is to improve water quality by reducing the amount of erosion-produced sediment reaching streams. This objective will be achieved by promoting conservation land treatment measures that will keep soil, fertilizer, and herbicides out of streams and on the land where they belong.

"We have to start at the top with terraces, then protect the land on down the watershed," says David Mitchell, Soil Conservation Service district conservationist for Sherman County.

By the end of 1979, 40 percent of the conservation measures included in the joint plans for the project by the Agricultural Stabilization and Conservation Service (ASCS), the Sherman County Soil and Water Conservation District (SWCD), and the Soil Conservation Service were completed. By the end of the 3-year project, 280,000 feet of terraces (nearly 62 feet of terrace per acre in Slaughterhouse Gulch), 22 sediment dams, and 16 acres of grassed waterways will have been built.

ACP funds are paying approximately 75 percent of the costs, with the city of Moro and the 23 landowners who agreed to participate in the program paying the remainder.

The Sherman County Station of the Columbia Basin Agricultural Research Center, which is also located within the watershed, has received $2,000 from Oregon State University to begin conservation work on its land, so the project has involved more people than the farmers.

According to Mitchell, the project approach has advantages over the individual approach. "It's good to see farmers and agencies working together to protect the land," he says.

Bob Olsen, who was named Conservation Farmer of the Year for 1980 by the Oregon Wheat Growers League and the Sherman County SWCD, is one of the project participants. He has put in nearly 11.8 miles of terraces, three dams, and six grassed waterways since the Slaughterhouse Gulch special project began. "The project approach gave all farmers in the area the opportunity to work together instead of putting in just a few, scattered conservation projects," he said.

Olsen says he has been able to begin more conservation measures than ever, due to the special project money. This funding is in addition to the regular ACP cost shares available to all farmers in the county.

One of the reasons Slaughterhouse Gulch was chosen over other prospects for the ACP funds was that the erosion control achieved by the terraces and dams is expected to protect not only farmland, but also the town of Moro and nearby roads, including a major highway.

Slaughterhouse Gulch also had an advantage over other proposed areas in that more than half the area was protected by structural measures before the project began. This indicated that farmers in the area might be willing to work on a concentrated project. The indication proved to be correct—nearly 77 percent of the watershed is now protected by terraces, dams, and grassed waterways.

Finally, the watershed's location along U.S. Highway 97 makes it a showcase for observation of the area.

The terraces and other land treatment measures constructed so far have reduced the runoff flow through Moro, according to Mitchell.

A monitoring system is in operation to measure runoff amounts, ground temperatures, and precipitation. The system is located in a small watershed area in the central region of Slaughterhouse Gulch. It was built on the Tex Irzyk farm, a participating farmer's land, by USDA's Science and Education Ad-

ministration and Oregon State University.

"Farming practices must work along with the land treatment measures, such as terraces, to control erosion," says Mitchell. He suggests stubble mulching and early fall seeding as examples of farm practices that are used to slow the runoff water to a walk below the terraces at the top of the watersheds.

Deborah Miller,
journalism student, recently graduated from the University of Oregon,
Eugene, Oreg.

Finding Funding to Improve Water Quality

by Warren M. Lee

For years the locally accepted way to handle dairy waste in Whatcom County, Wash., was to let it wash into a stream and hope for high water every so often to clean the area. But as a result of the Federal Water Pollution Control Act of 1972 (Public Law 92-500) and the Clean Water Act of 1977, a statewide dairy waste management plan was developed and it was no longer acceptable to dump animal wastes into streams.

To find out the extent of the problem in the county, Soil Conservation Service personnel conducted a farm-to-farm inventory. The results of the inventory showed that about 90 percent of the 512 dairies needed improved waste management systems.

Agricultural Conservation Program cost-share funds were available for long-term agreements (LTA's) with farmers who developed conservation plans to install waste management systems; but in fiscal year 1980, Whatcom County was allotted funds for only six LTA's.

Other sources of funding had to be found. One stream in particular, Johnson Creek, had serious pollution problems, and the Whatcom County Conservation District and the Soil Conservation Service decided to target assistance to this area.

The 50 farmers in the area formed a drainage improvement district (DID #31) and applied to the State Department of Ecology (DOE) for $70,000 from State funds set aside for improving water quality being degraded by agricultural sources. DOE approved the funding and DID #31 agreed to match it with tax revenues raised by the district. The farmers are using the money to clean out the wastes, organic matter, and reed canarygrass that are choking the stream.

To hasten the cleanup, the farmers—following recommendations of the State Departments of Fisheries and Game, the U.S. Department of the Interior's Fish and Wildlife Service (FWS), and SCS—used their own money to clean about 18,000 feet of the stream down to the gravels found naturally along the bottom. The use of a dragline, however, left an unprotected bank on one side of the stream. SCS District Conservationist John Gillies made arrangements through the FWS to get a Young Adult Conservation Corps (YACC) crew to revegetate the bank.

The crew planted thousands of snowberry and dogwood cuttings to stabilize the bank, reduce erosion, improve wildlife habitat, and shade the stream, which keeps the water cool and slows the growth of reed canarygrass.

Another cause of the pollution was direct access of livestock to the stream. The farmers in DID #31 needed funds to help them fence the stream corridor. Their application to USDA's Agricultural Stabilization and Conservation Service for Agricultural Conservation Program cost-share funds was approved and the YACC installed the fence.

These efforts solved the problems of the clogged stream and access by livestock but did nothing to help the individual dairy farmers with their waste management systems.

For an additional source of funds, the group of farmers applied to SCS for assistance under the Watershed Protection and Flood Prevention Act. Under provisions of the watershed plan, which was approved in July, farmers will receive technical and financial assistance to carry out dairy waste management plans.

Throughout the complicated search for funds, the farmers and the agencies they worked with have kept their primary goal in sight: to improve water quality in Johnson Creek. With everyone working together, the chances are good that this once-polluted stream will become a prime rearing area for the Coho salmon and cutthroat trout.

Warren M. Lee,
was area conservationist, SCS, Bellevue, Wash., and is now assistant State conservationist, SCS, Spokane, Wash.

City Applies Sludge on Cropland

by Russell W. Harper

The use of city sewage as fertilizer could increase crop yields, restore productivity to eroded cropland, and save municipalities thousands of dollars.

The Board of Water and Sewer Commission of the city of Florence, Ala., and the Tennessee Valley Authority (TVA) are evaluating agricultural uses of treated sewage sludge on a farm 3 miles west of Florence. The results may benefit other cities looking for a safe and economical way of disposing of their municipal sewage sludge. Results may also be helpful in recommending land application of municipal sludge in other agricultural areas.

The project was conceived by James Hughes, manager of the Florence Water and Sewer Department, and Dr. H. A. Henderson of TVA's Division of Agricultural Development.

Project goals are to determine the feasibility of disposing of sludge on the land and to demonstrate a simple method of applying sludge which is appropriate to a site. Such a system would allow an individual operator to contract with the city and various farmers to haul and spread the sludge, thereby allowing farmers to use the sludge as a supplement to their soil fertility program.

Long-term goals are to develop, evaluate, and demonstrate economical and environmentally sound means of meeting the 1984 requirements for water quality by small communities near agricultural areas.

The Soil Conservation Service and TVA provided soil information on the proposed site. The U.S. Environmental Protection Agency and the Alabama Water Improvement Commission approved the project. Thus, Florence became the first and remains the only city in Alabama to be granted a permit to dispose of treated sewage sludge on the land.

The sludge was applied to a 1½-acre plot in fall 1978. In spring 1979, corn, cotton, and soybeans were planted on the plot. Midland bermudagrass was planted on 7 additional acres. Sludge is applied to the bermudagrass plot several times during each crop growing season at a rate of 17 dry tons per acre per year. This combination will allow year-round application of sludge.

Liquid, aerobically digested sludge was injected into the soil for crops at a low application rate of 11 metric tons per hectare and a high rate of 78 metric tons per hectare. It was injected by a four-wheel-drive, high-flotation applicator equipped with a 2,200-gallon tank and a set of four applicator knives.

Results after the first cropping season indicate that the 11-metric-ton rate of sludge provided adequate amounts of essential plant nutrients to sustain excellent yields of corn, cotton, and soybeans (see table).

Analysis for heavy metals in the crops indicated slightly higher concentrations than the nontreated

Community Irrigates With Wastewater, Saves Money

by James M. Ridler

About 5 years ago, the city of Gettysburg, S. Dak., discovered that wastewater being discharged from the sewage treatment plant did not meet environmental standards, but the city couldn't afford the $450,000 in construction costs to upgrade the plant.

The city council turned to the North Central Resource Conservation and Development (RC&D) Council for help. The RC&D council suggested that the city use the excess wastewater for irrigation.

The city wanted to find out if it could safely irrigate 40 acres of city-owned land next to the treatment plant and requested a soil survey from the Soil Conservation Service. The soil and water had to be analyzed to determine if they were compatible for irrigation. Water samples taken from the sewage lagoon were analyzed for heavy metals and salts.

South Dakota's Department of Water and Natural Resources made an onsite check to make sure there was no threat to ground water in the area and that the system would be environmentally safe. The department approved the site and the irrigation system, and the city decided to install the system.

For the installation cost of $25,600, the city of Gettysburg now

crops, but concentrations did not approach toxic levels.

Local farmers are interested in the project and officials of the city of Florence hope to sell sludge to them in the future. This could save the city the cost of expanding the sewage treatment facilities, estimated at nearly $100,000.

Environmental effects on surface and subsurface soils and water are being monitored by TVA researchers. Ground water quality is being measured in test wells on and off the application sites. The surface runoff water is being monitored in each watershed by automatic sampling devices. After 18 months of sampling runoff for heavy metals, there appeared to be no difference in runoff from the watershed where sludge was applied and the untreated watershed.

Russell W. Harper,
district conservationist, SCS,
Florence, Ala.

First Year Crop Yields

Treatment	Corn *bu/ac*	Seed cotton *lbs/ac*	Soybeans *bu/ac*
Untreated plot	36	1,138	48
Commercial fertilizer (168 kg/ha)	150	2,673	50*
Low sludge application rate (11 metric tons/ha)	175	2,355	56
High sludge application rate (78 metric tons/ha)	162	1,892	52

Values represent average of two crop varieties and two levels of soil pH. There was no significant difference due to pH or variety.

*No nitrogen was added to soybeans.

has a center pivot irrigation system that will safely dispose of excess wastewater from the sewage treatment plant. The city plans to lease the system and land to a local farmer, who will grow crops for feeding cattle. The rental income will help pay for the system.

Allen Faulkner, SCS soil scientist in Gettysburg, says, "Any community faced with excess wastewater from their sewage system should consider an irrigation system.

"However," Faulkner cautions, "the irrigation system may not work for all expanding communities. Soil type and water quality must be compatible. Communities with a lot of industry could have wastewater with a high level of heavy metals. Communities using a lot of water softeners could have a sodium problem. Soil and water compatibility is an absolute must before an irrigation system is feasible."

A community can use the local soil survey and a U.S. Geological Survey topographic map to determine if there is a suitable site near its sewage treatment facility. In addition, a water analysis will define the quality of wastewater from the sewage system.

The city funded the project and received technical assistance from the Potter County Conservation District and the North Central RC&D Council. The SCS staff in the Gettysburg field office worked with Pat Kuck, the RC&D coordinator, and Norman Kempf, the SCS area conservationist in Pierre, to provide assistance to the city council.

James M. Ridler,
district conservationist, SCS, Gettysburg, S. Dak.

News Briefs

Federal Guidelines on Sludge Application Issued

To reassure food processing companies that fruits and vegetables grown in soil fertilized with good quality sewage sludge are safe to eat, the U.S. Department of Agriculture (USDA), the U.S. Environmental Protection Agency (EPA), and the Food and Drug Administration (FDA) published a joint statement of Federal policy and guidelines on the land application of municipal sewage sludge.

Food processing companies are worried that some types of sewage sludge might contaminate fruits and vegetables with excessive and toxic amounts of heavy metals, such as cadmium or lead; toxic organic compounds such as PCB's; and human or animal disease micro-organisms.

USDA's Soil Conservation Service is involved because sludge is applied to the land and presents both benefits and potential hazards to soils. An overdose of cadmium or lead could make soils unsuitable for vegetable or fruit production for an indefinite period of time. On the other hand, sludge improves the overall tilth and fertility of soils.

"SCS wants good sludge, sludge that contains low concentrations of toxic substances, to be used wisely on land. It is an excellent addition to land," explained Charles Fogg, SCS environmental engineer. "If sludge is not applied to land, it can only be burned or dumped into bodies of water, including the oceans. Incineration without air pollution is too costly; ocean dumping will not be allowed in the future—that leaves only the land. If sludge isn't used beneficially on land, then you have to bury it in land that cannot be used for farming."

SCS gives technical assistance to fruit and vegetable growers to help them use good sludge properly. For example, SCS identifies the soils and crops best suited for sludge applications.

Dr. Milt Meyer, an SCS soil scientist, is directing a 4-year national cooperative study by USDA, EPA, and FDA to determine background levels of cadmium, lead, and other elements in soils. An interagency planning group recommended this study in 1977 and the study began in 1979. FDA needs to know the amount of metals occurring naturally in crops grown in major crop-producing areas before it can set realistic, safe levels in foods. EPA needs to know which soils will produce crops with minimum concentrations of these metals after sludge is applied. Also this study will improve SCS recommendations about sludge application.

The three agencies will evaluate the data collected in this study, along with other new scientific data, to refine regulations and guidelines to insure proper use and disposal of sewage sludge.

Donald L. Comis,
assistant editor, *Soil and Water Conservation News*, SCS, Washington, D.C.

Salinity Control Program Reduces Salt in Colorado River

The salt of the Earth found in the Colorado River Basin pollutes irrigation waters and destroys uncounted dollars worth of crops. It also causes corrosion of pipelines and early replacement of water heaters in urban areas like Los Angeles.

The Soil Conservation Service and other government agencies are now working with farmers in the Grand Valley of western Colorado to improve irrigation systems and reduce salt flow into the Colorado River. Seepage loss from unlined ditches and deep percolation from field irrigations are major culprits. Deep percolation occurs when irrigation water is applied in excess of crop needs. This excess water percolates through the soil profile and below the root zone.

The Colorado River Basin Salinity Control Act (Public Law 93-320), passed in 1974, directed the U.S. Departments of Agriculture and Interior to cooperate in reducing salt loads from irrigated lands to improve water quality delivered to downstream users in the United States and Mexico.

Salt loading from the Grand Valley near Grand Junction, Colo., is a result of the high salt content of the Mancos shale underlying the area. Deep percolation of water from existing irrigation systems dissolves the salts and carries them back to the Colorado River.

John Miller was one of the first irrigators to install salinity control measures on his farm in the Grand Valley. He received cost-share assistance through USDA's Agricultural Stabilization and Conservation Service (ASCS).

Miller installed a concrete-lined ditch and gated pipe system controlled by timers. The ditch has a number of drops where automatically timed gates are installed to back the water up for a specified time causing it to flow out of the ditch ports onto the field.

Miller says the system eliminates the need to get up in the middle of the night to change water.

"This type of system can cut 75 percent off the time a farmer would spend irrigating his fields," said Miller. "It used to take me half an hour just to fill my ditch. I had to go back adjusting siphon tubes to try and get the right flow. Now, I just set it and forget it. In 5 minutes, my ditch is filled."

SCS provided technical assistance to 380 farmers in the project area during fiscal year 1980. Some 140 farmers completed conservation practices. More than 85,000 feet of underground pipeline and almost 54,000 feet of concrete ditch were installed.

District Conservationist Emery Johnson says, "In developing conservation plans, we give priority to reducing seepage and deep percolation. We've found that deep percolation feeds the ground water and dissolves salts and transports them to the river."

The Grand Valley contributes 600,000 to 700,000 tons of salt each year to the Colorado River. Onfarm irrigation is responsible for about one-third of that. Each ton of salt causes approximately $52 in damages to downstream water users.

The onfarm and related lateral improvement program being implemented by SCS, ASCS, and local conservation districts will, when completed in 10 years, reduce salt loading in the river by 230,000 tons annually. The total cost will approach $41 million.

Brice E. Boesch,
irrigation engineer,
SCS, Denver, Colo.

USDA Approves Eight Additional Rural Clean Water Program Projects

Secretary of Agriculture John R. Block approved eight more sites at which the U.S. Department of Agriculture will carry out experimental projects under the Rural Clean Water Program to combat agricultural-related pollution. The cost of the program is estimated at $20 million.

The projects are in Florida, Massachusetts, Minnesota, Nebraska, Oregon, Pennsylvania, South Dakota, and Virginia, and bring the total number of approved clean water projects to 21.

Block said participation is voluntary and open to any owner or operator of privately owned farmland whose activities contribute to agricultural nonpoint sources of pollution in the project area. Applications are made to the county committee of USDA's Agricultural Stabilization and Conservation Service which administers the projects.

Practices which qualify for cost-sharing are those that reduce pollutants entering a stream or lake or prevent their leaving their source. Practices that do more to increase agricultural production than to reduce pollution are not eligible, Block said.

USDA's Soil Conservation Service will coordinate technical assistance which will be provided by that agency, as well as by the Cooperative Extension Service, Forest Service, and the conservation districts. Also assisting in carrying out the projects will be State soil and water conservation and water quality agencies.

Acid Precipitation Research Plan Published

A Federal task force has published a draft of a plan for a 10-year acid precipitation research program. The program, required by the Acid Precipitation Act of 1980, will identify the causes and effects of acid precipitation and find out what the Federal Government can do about it.

The Interagency Task Force on Acid Precipitation will coordinate U.S. acid precipitation research with that of other nations.

The effects of acid precipitation on lakes, streams, and wetlands are better documented than those on crops and forests. Acid precipitation does contribute needed sulfates and nitrates to crops, but laboratory studies suggest that acid precipitation can also damage plants and soils.

The U.S. Department of Agriculture is coordinating the research on the effects of acid precipitation on land as part of the $50 million research program authorized by the Acid Precipitation Act. The research on the effects of acid precipitation on land includes evaluating the effects on forests, range plants, crops, and soils. USDA is also studying how much metal acid precipitation leaches from soils to contaminate drinking water, food crops, and fish.

The Acid Precipitation Act is part of the Energy Security Act of 1980 which Congress passed to increase the Nation's security by reducing its dependence on imported oil.

Acid precipitation is related to U.S. energy goals because the Nation is using more coal, which can

be a source of acid precipitation when it is burned. National Coal Association figures show that the United States used 702.4 million tons of coal in 1980, compared to 557.5 million tons in 1975.

Partly to document this potential increase in acid precipitation, Federal agencies are building global and national acid precipitation monitoring networks that will incorporate several existing networks.

Current Federal activities such as these monitoring networks will provide a foundation for the future national acid precipitation program.

Donald L. Comis,
assistant editor, *Soil and Water Conservation News*, SCS, Washington, D.C.

New Plant Materials Center for South Texas

A new South Texas Plant Materials Center will be established as a result of a three-party agreement signed April 13 at Kingsville, Tex.

The center will be established cooperatively by the Caesar Kleberg Wildlife Research Institute, Texas A&I University; the South Texas Association of Soil and Water Conservation Districts (SWCD's); and USDA's Soil Conservation Service.

The center is needed in South Texas because of the region's unique climate, natural resources, and conservation problems. South Texas has 23 million acres of land, 80 percent of which is rangeland or improved pastures supporting more than 1.5 million cattle, 200,000 deer, and other important domestic animals and wildlife. Because of a tropical and subtropical climate, plant materials tested outside the region often are not adapted to South Texas.

The closest existing plant materials center is 400 miles north of the region at Knox City, Tex.

Efforts will be made to gather and evaluate native and introduced plants that show promise for furnishing cool-season forage to reduce costly livestock supplemental feed, various plants to enhance habitat for economically important wildlife, and new plants to establish on reclaimed strip mine areas.

Under the agreement, the Caesar Kleberg Wildlife Research Institute and Texas A&I University will make available up to 50 acres of university-owned land for use by the center; furnish office and laboratory space; provide personnel and equipment; and share in the cost of operating the center.

The South Texas Association of SWCD's agrees to provide leadership in attempting to raise any additional operating funds needed and to help evaluate promising plant materials through field evaluation plantings on South Texas farms and ranches.

SCS agrees to provide a manager as well as plant materials from other centers and collections of promising plant materials for evaluation.

A three-person board will be established, consisting of one member from each of the three parties, to formulate policy for operating the center.

Dale D. Allen,
public information officer,
SCS, Temple, Tex.

Hugh Hammond Bennett on Conservation

Hugh Hammond Bennett, first chief of the Soil Conservation Service, was a prolific writer and tireless speaker on the cause of conservation. Much of what he said and wrote continues to be sound advice, not only for Americans, but also for the peoples of many other countries with critical soil erosion and sedimentation.

The following excerpts are from a series of lectures delivered by Dr. Bennett in June 1959 to students at North Carolina State University in Raleigh.

No Shortcuts

There is no blanket, short-cut method for getting the conservation job done. There is no quick and easy way out. In order to assure its continued productiveness, every acre of land must be scientifically treated—which means treatment according to need, and use according to the capability of the land for producing the various crops, whether corn, wheat, grass, timber, or wildlife. This is the first basic principle of soil conservation.

Six Keys to Soil Conservation

We know now that:

1. Productive land is neither limitless nor inexhaustible.
2. Land must be expertly cared for if it is to be maintained in a productive state.
3. Productive land must assume an ever more prominent position in the thinking of the people and their leaders. As the source of food for all people—rural and urban—it

must have the regular, intelligent consideration that such indispensible wealth merits.

4. Since society as a whole depends on the produce of the land for its present and future existence, society as a whole must share in the responsibility and costs of maintaining land in a productive state. The individual landowner or operator has neither the resources nor the ability to carry the burden alone, and moreover he has control only for a lifetime.

5. Science must inevitably devote an increasing share of its attention to the problems of maintaining and improving the yield of productive land.

6. The technological key to future consideration of land development is scientific analysis of each parcel of land of any important extent to determine: (a) the type of production for which it is best suited physically and economically, as between row crops, forage, grain, trees, or wildlife; and (b) the conservation measures necessary to maintain it in a permanently productive state under maximum use.

Still Losing Soil

As long as raindrops continue to spatter bared soil into muddy sludge, soil will continue running off cultivated slopes into the rivers and oceans. This is soil erosion; its control or prevention is soil conservation.

We are still losing by erosion an estimated half million acres of farmland every year.* This is only about half as much as was being lost in the beginning of the conservation program, but it is more than we can afford to lose in view of two important facts: (a) our population is mounting with astonishing rapidity, and (b) we are still losing soil by erosion and by using land for new roads, buildings, airstrips, parks, and so on at the rate of about 3 million acres a year—some of it top-grade farmland. This loss of arable land is dangerously excessive.

Upstream Flood Damages

The crops of upland fields that are washed out or covered with eroded soil resulting from rains upslope are just as truly lost as those on overflowed land in the valleys below. Soil washed out of upland fields reduces the productivity of that land just as much as, or more than, deposition of smothering soil carried by waters flooding agricultural bottomlands along the rivers.

Reducing Floods With Conservation

Every additional gallon of water that can be stored in the soil through the use of conservation measures means 1 gallon less contributed to flood flows. A first step in flood prevention, then, is to keep the soil in optimum condition for maximum water intake. This will require the maintenance of good soil structure, good cover of vegetation wherever practical, and efficient structures wherever required. What excess water runs off the fields into the drainageways must be slowed down with small retarding structures along these headwater drainages....

Waste Must Stop

When Europeans came to America, the United States (then virgin country) was covered on an average with about 9 inches of productive topsoil.... That average has been reduced to about 6 inches, as indicated by erosion surveys. That unnecessary wastage of soil concerns you—and me. It affects all of us whatever occupation we are engaged in.... A mounting world population, coupled with a limited and declining supply of productive land, can defeat man here on earth—will defeat him certainly if he goes on stupidly wasting the substance of life—productive land.

*According to a 1977 inventory, the United States is losing about 6.4 billion tons of soil each year from various types of erosion.

Management Tips

Readers are invited to submit "Management Tips" to the editor, *Soil and Water Conservation News*, Soil Conservation Service, P.O. Box 2890, Washington, D.C. 20013.

Tips on Producing a Suburban Homeowner's Guide

Homeowners in Fairfax County, Va., have a new resource to help them manage suburban lots. The Northern Virginia Soil and Water Conservation District recently published "You and Your Land: A Homeowner's Guide for Fairfax County."

The conservation district board conceived the idea, developed an outline, produced a draft, and applied to the U.S. Environmental Protection Agency and the Virginia State Water Control Board for grants to cover the publishing and distribution costs.

The 64-page booklet summarizes the advice of a large number of experts on such topics as wet basements, flooding, erosion control, planting, fertilizing, pruning, spraying, pest and litter control, and management of common lands and woodlands. The district received help from county and State agencies as well as the Soil Conservation Service.

The district distributed the 10,000 copies from the first printing of the booklet to groups throughout the county including the county board of supervisors and county public affairs office, chamber of commerce, League of Women Voters, Welcome Wagon, and homeowner associations. Realty groups in the county have also shown a strong interest in the publication. Because of the demand for the publication, the district is seeking additional funds for a second printing.

Bill Adams, SCS district conservationist for Fairfax County, offers advice to other districts that might be interested in producing a similar booklet: "Find a good editor, as we did. Also, don't rely exclusively on grants to fund your publication. Work ahead of time to get a local sponsor to help pay for printing and distributing it."

Conservation Tillage Slide Show Available

A new slide set, "Conservation Tillage," is available through the U.S. Department of Agriculture.

Produced by the Soil Conservation Service, the 11-minute show features the growth of conservation tillage and discusses the benefits and problems of adapting conservation tillage systems in various parts of the country.

Although the systems vary from one part of the country to another, they all eliminate some of the conventional practices associated with crop tillage such as plowing, disking, and cultivating. At the same time, the system leaves a mulch on the surface of the soil that protects it from erosion.

"The show points out that conservation tillage saves time and fuel, as well as soil," said Gerald Darby, SCS chief agronomist. "And there are millions of acres where some form of conservation tillage can be beneficially applied."

The show, Slide Set A-69—containing 78 slides, programed cassette tape, and illustrated narrative guide—may be obtained from the Photography Center, Office of Governmental and Public Affairs, U.S. Department of Agriculture, Washington, D.C. 20250. Cost is $20.75.

The "Dear Abby" of Conservation

People who live in and around Meade, Kans., know where to go if they have a question about conservation. For the past 8 months the Soil Conservation Service field office in Meade has published a column in the weekly newspaper that answers questions about soil and water conservation.

SCS Range Conservationist Deborah Hazelbeck, who came up with the idea, does most of the work on the column along with Natalie Unzicker, the Meade County Conservation District secretary. They recently expanded the column, called "Conservation Corner," to include a section called "Kids Corner," which Unzicker writes on topics that interest children in language they can understand.

Meade has a population of about 2,000 and there are about 5,000 people in the county. The county is about 40 percent ranching, 20 percent irrigated land, and the rest dryland farming.

"We have a good working relationship with the newspaper," said Arnold Mendenhall, SCS district conservationist, "so we didn't have any trouble convincing the editor to run the column.

"The questions come from people who call us or come into the office or from people we work with in the field. Sometimes our district directors pass along questions people have asked them," explained Mendenhall. "Our office is in an agricultural service center, so people who may be waiting to see someone in another agency may stop by our office with a question while they're waiting.

"A lot of the questions surprised us because we thought everybody knew the answer," he continued. "For example, one person asked us how much it would cost to have us come out and do a survey for a land leveling job.

"Some people are too embarrassed to ask questions and some aren't sure whom to ask. The column is a good tool to get more information out to the public, but it takes someone like Deborah, who is good at writing, to make it work."

District Sponsors Workshops

The Strafford County Conservation District, located in Dover, N.H., sponsored two workshops aimed at municipal officials making land use decisions. The first workshop, on agricultural, residential, and municipal waste management, brought top speakers together to address problems related to septic systems, solid waste disposal problems, and soil.

The second workshop dealt with ground water resources and the effects landfills can have on ground water when soils are not compatible with the site selected. Experts from Federal, State, and local agencies, such as the Soil Conservation Service, Cooperative Extension Service, U.S. Environmental Protection Agency, U.S. Geological Survey, and New Hampshire Solid Waste Bureau, as well as the University of New Hampshire, participated.

Maureen Stabile,
program coordinator, Strafford County Conservation District, Dover, N.H.

RC&D Information Measure Gets Water Quality Program Off to Successful Start

How do you manage a water quality program in a watershed that covers two counties? It's not easy because both areas are accustomed to thinking in terms of county boundaries.

In western Wisconsin, the Hay River watershed in Barron and Dunn Counties presented this kind of challenge. The 187,000-acre drainage area is about equally divided between the two counties.

Under the Federal Water Pollution Control Act of 1972 (Public Law 92-500), Wisconsin developed a statewide water quality management plan. Under the plan, five watersheds were designated as having critical water quality problems. One of these, the Hay River watershed, was selected for a nonpoint source pollution cleanup program funded by the Wisconsin Fund, State money set aside for pollution abatement in surface waters. Of the $1.2 million earmarked for nonpoint source pollution control, $200,000 per year will go to Barron and Dunn Counties for cost sharing nonpoint source pollution control measures.

To successfully implement the new water quality program, an information campaign for the 1,400 landowners in the watershed was launched.

The information campaign was taken on as an associated measure by the River Country Resource Conservation and Development (RC&D) Council, which covers a nine-county area in western Wisconsin. It was the ideal organization for the job because:

- It was an objective organization with areawide rather than countywide interests;
- It had experience dealing with a variety of agencies and local units of government;
- It was already involved in other information activities through its part-time University of Wisconsin-Extension employee.

River Country RC&D had two information objectives for the Hay River watershed: to provide a bimonthly newsletter to 1,400 landowners, and to provide a quarterly information sheet to elected county officials who make up the designated management agencies in Barron and Dunn Counties.

How effective has this information program been? Soil conservationists in the two counties say that many of the contacts of the people who have nonpoint source pollution problems, especially absentee landowners, have been made through the newsletter; and that when people have been contacted by a technician, they have understood the program. In 1980, the first year of the program, nearly 55 contracts were signed.

The Hay River newsletter has become a model for other water quality programs in other parts of the State. Other watersheds in west-central Wisconsin have already asked for the same kind of assistance to get their water quality programs started.

It's an unusual measure, perhaps, for an RC&D area, but it has been important to the success of Wisconsin's water quality program.

Douglas Sorenson,
educational resource conservationist, River Country RC&D Area, SCS, Eau Claire, Wis.

Meetings

September	7-11	Federal Bar Association, Denver, Colo.
	13-16	International Association of Fish and Wildlife Agencies, Albuquerque, N. Mex.
	16-18	American Fisheries Society, Albuquerque, N. Mex.
	16-18	National Waterways Conference, Inc., St. Louis, Mo.
	20-22	World Fertilizer Conference, New York, N.Y.
	21-25	Association of Interpretive Naturalists, Inc., Estes Park, Colo.
	22-25	National Conference of Editorial Writers, Providence, R.I.
	24-28	American Horticultural Society, Boston, Mass.
	27-30	Society of American Foresters, Orlando, Fla.
October	3-6	Farm and Industrial Equipment Institute, Hot Springs, Va.
	4-8	American Association of State Highway and Transportation Officials, Chicago, Ill.
	4-9	Water Pollution Control Federation, Detroit, Mich.
	7-8	Agricultural Research Institute, Washington, D.C.
	7-9	Hardwood Plywood Manufacturers Association, Vancouver, British Columbia, Canada
	10-15	National Environmental Sanitation and Maintenance Educational Conference, Clearwater Beach, Fla.
	11-14	American Forestry Association, Sante Fe, N. Mex.
	22-25	National Association of Biology Teachers, Inc., Las Vegas, Nev.
	25-29	Congress for Recreation and Parks, Minneapolis, Minn.
	26-30	American Society of Civil Engineers, St. Louis, Mo.
November	2-5	Geological Society of America, Cincinnati, Ohio
	8-11	National Agricultural Bankers Conference, Washington, D.C.
	8-11	National Association of State Universities and Land Grant Colleges, Washington, D.C.
	8-11	National Forest Products Association, San Diego, Calif.
	8-12	American Institute of Chemical Engineers, New Orleans, La.
	9-16	The National Grange, Spokane, Wash.
	12-14	Future Farmers of America, Kansas City, Mo.
	15-18	American Society of Farm Managers and Rural Appraisers, Louisville, Ky.
	21-24	American Society of Landscape Architects, Washington, D.C.
	29-Dec. 4	American Society of Agronomy, Crop Science Society of America, and Soil Science Society of America, Atlanta, Ga.

New Publications

Observations on Land Policies and Programs

by V. Webster Johnson

This book provides a concise history of land policies and programs in the United States. The author's broad international and national professional experience enables him to pinpoint the importance of land tenure on the political, social, and economical well-being of a nation. He evaluates land policies and relates national land use conditions to national land use policies.

The book provides an international view of land use policy background, history, impacts, and existing issues. It is recommended for those beginning their studies in land use policy formation.

The book is available for $10 per copy from V. Webster Johnson, III, 12 Gerard Court, Rockville, Md. 20850. For orders of 25 or more copies the price is $8 per copy.

Acid Rain

by the U.S. Environmental Protection Agency

This 32-page report is a gathering of information by the U.S. EPA on acid rain.

The report discusses the effects and damages due to acid rain on aquatic ecosystems, soil systems, vegetation, man-made objects, and humans.

Copies are available for $3.25 from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. (Stock No. 055-000-00198-7.)

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